



## **Economic Impact Analysis Virginia Department of Planning and Budget**

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### **9 VAC 25-260 – Water Quality Standards State Water Control Board August 23, 2001**

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The Department of Planning and Budget (DPB) has analyzed the economic impact of this proposed regulation in accordance with Section 9-6.14:7.1.G of the Administrative Process Act and Executive Order Number 25 (98). Section 9-6.14:7.1.G requires that such economic impact analyses include, but need not be limited to, the projected number of businesses or other entities to whom the regulation would apply, the identity of any localities and types of businesses or other entities particularly affected, the projected number of persons and employment positions to be affected, the projected costs to affected businesses or entities to implement or comply with the regulation, and the impact on the use and value of private property. The analysis presented below represents DPB's best estimate of these economic impacts.

### **Summary of the Proposed Regulation**

The proposed regulations will establish two additional water quality criteria for bacteria and gradually phase out the current criteria. In addition, the water quality ammonia standard will be less stringent and point sources will be given an option to demonstrate the absence of early life stages of fish in a waterbody in order to comply with less stringent ammonia standards than the proposed levels.

### **Estimated Economic Impact**

The purpose of the water quality standards is to protect the state waters for designated uses including fish consumption, shellfishing, aquatic life, swimming, drinking water, and conservation in general. The standards include narrative and numerical criteria for physical, chemical, and biological characteristics of water set at levels to protect the use of the waterbody. Pollutants can limit the designated uses of water.

If the concentration levels for a pollutant measured in a waterbody exceed the criteria more than 10% of the time, the stream, creek, lake, or river is classified as impaired. These waters are listed in the 303(d) list of impaired waters and a total maximum daily load (TMDL) must be developed and implemented to bring the waterbody into compliance with the water quality standards. A TMDL reflects the total pollutant loading a water body can receive and still meet the water quality standards. TMDLs are pollutant specific. A TMDL establishes the maximum allowable pollutant loading from both point and nonpoint sources for a waterbody, allocates the load among the pollutant contributors, and provides a framework for taking actions to restore water quality. While the TMDL program has significant implications for the point sources, probably the most significant impact is on the nonpoint sources. This is because point sources are subject to discharge limits under permits issued to them. The 303(d) list and developed TMDLs are submitted to the federal Environmental Protection Agency (EPA) for review and approval.

Currently fecal coliform concentrations are employed as a bacteria indicator in the regulations to establish water quality standards to protect people from the risk of gastrointestinal illness contracted while swimming. Pollution from both point and nonpoint sources can lead to fecal coliform bacteria contamination of waterbodies. Sources of fecal contamination to surface waters include wastewater treatment plants, on-site septic systems, domestic and wild animal manure, and storm runoff. The fecal coliform is found in the intestinal tract of warm-blooded animals; consequently, fecal waste of warm-blooded animals contains fecal coliform. Even though fecal coliform is not pathogenic, its presence in water indicates the potential for contamination by fecal material. Thus, recreational activities in contaminated waters and eating shellfish might be a health risk. Since it is difficult, time-consuming, and expensive to test directly for the presence of a large variety of pathogens, water is usually tested for fecal coliforms instead. For primary contact recreational uses such as swimming and kayaking, health risk increases with fecal coliform count in the waterbody. For a waterbody to comply with Virginia regulations, fecal coliform standards for primary contact recreational use must be met.

The proposed changes will update the bacteria criteria designed to protect waters for primary contact recreation activities. According to EPA, the correlation between different bacterial indicators and the occurrence of digestive system illness at swimming beaches suggests that the best indicators of health risk from recreational water contact in fresh water are *E. coli*

and enterococci. Like fecal coliform bacteria, these organisms indicate the presence of fecal contamination. Enterococci are distinguished by their ability to survive in salt water, and in this respect they are more representative for pathogens than the other indicators are. EPA recommends enterococci as the best indicator of health risk in salt water used for recreation and as a useful indicator in fresh water as well. EPA recommends that all states adopt an *E. coli* or enterococci standard for fresh water and enterococci standard for marine waters by 2003, and consequently disapproved the current fecal coliform standard established in Virginia regulations. Thus, EPA and the Department of Environmental Quality (the agency) are pursuing the adoption of the proposed standards. Adoption of only one indicator would be satisfactory to EPA, but the Virginia Department of Health requests adoption of *E. coli* and enterococci standards simultaneously for fresh water.

These alternate bacteria are better indicators of the risk of contracting gastroenteritis from fecal contaminated waters than Virginia's current fecal coliform standard.<sup>1</sup> Preliminary Virginia data collected by the agency from surface waters show that the water quality criteria recommended for the new indicators are exceeded as often or more often than the fecal coliform criterion. From this preliminary analysis, it seems that the number of impaired water designations will increase if the two alternate bacterial indicators are adopted. The current fecal coliform standard will be phased out over time as more samples are collected from all state waters. According to the agency, it would take about two years to replace the current standard with the proposed one for a specific waterbody since at least twelve data points are required to implement the new criteria. However, the phase in process for all state waters is expected to take up to 2008.

Testing for two new indicators of health risks is expected to improve the identification of waters that have a potential to contract digestive diseases. Once the identification is made, the quality of these waters is likely to be improved through the TMDL process. Thus, the count of digestive illness occurrences because of the contact with impaired waters is likely to decline, but there is not enough information to estimate by how much.

Monitoring for two additional indicators will increase the analysis costs of the agency. It is expected that the analysis costs associated with *E. coli* and enterococci will be about \$33 per

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<sup>1</sup> Source: EPA and the agency.

sample. The tests for E. coli and enterococci require different procedures than the test for fecal coliform. Most of the additional costs can be attributed to additional labor requirements to conduct the additional two tests. The agency monitors approximately 800 samples from stations every two months. Thus, the agency's monitoring costs are likely to increase about \$158,400 per year. However, once the phase in completed, state waters will no longer be tested for fecal coliform concentrations. The testing cost for fecal coliform is approximately \$14.50 per sample.<sup>2</sup> Thus, the agency is expected to realize about \$69,600 in savings from eliminating fecal coliform testing annually when the phase in is completed.

In addition, point sources are issued a permit and are required to test water for pollutants. There are 726 pollutant discharge elimination system sewage discharge permittees in Virginia. Most of these permits contain limits for disinfection of chlorine residual in lieu of fecal coliform limits. It is assumed that the waters are free from fecal coliform contamination if there is sufficient chlorine residual. The same practice is likely to continue. However, 222 permits contain fecal coliform limits instead of, or in addition to, chlorine residual limits. This occurs primarily at facilities using substances other than chlorine for disinfection. As mentioned before testing for two additional indicators is expected to increase the testing costs. If the new indicators are used as the permit limits instead of fecal coliform, this could increase costs by approximately \$8,000 per facility per year with weekly monitoring. One major facility with daily monitoring requirements provided a cost estimate of \$60,225 per year for testing E. coli and enterococcus. These suggest that the additional cost per sample is likely to be between \$154 and \$165 for sewage discharge permittees. This estimate is significantly greater than the estimated testing costs to the agency because most point sources do not have laboratories of their own. The required testing frequency varies from once a year to three times a day depending on the source. Based on the frequency data provided by the agency approximately 24,767 samples are tested by the permit holders every year. Thus, the total testing costs to point sources are expected to increase by about \$3.8 million to \$4 million per year. On the other hand, the requirement for the fecal coliform test will be phased out gradually. The fecal coliform test costs incurred by the point sources is estimated to be three times more than the costs to the agency, totaling about \$43.50. Thus, the point sources are likely to experience about \$1.1 million in annual savings from eliminating fecal coliform test when the transition is completed.

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<sup>2</sup> Source: The agency.

Also, fiscal impacts to the state and nonpoint sources are expected due to the effect the new bacterial indicators will have on the TMDL program. According to the agency, preliminary analysis of bacterial data at 100 sites statewide over the past year indicates that the number of samples exceeding the enterococci standard is 40 percent higher than the number of samples exceeding the existing fecal coliform criteria. It is expected that approximately 102 additional TMDLs will be developed during the next ten years as a result of the proposed criteria. Development of TMDLs requires significant amounts of labor to collect data, to determine land uses, animal densities, crop densities, the number of septic systems, contributions from point sources, and to construct a simulation model. According to the agency, developing a fecal TMDL may require \$33,000 to \$76,000 depending on whether modeling is needed or not. Half of the TMDLs are expected to fall at the low end and the other half at the upper end of the cost scale. Thus, a cost increase of approximately \$5.5 million to develop 102 additional bacterial TMDLs is expected. The agency incurs the development costs, but some funding is provided from the federal government. Currently, the federal government funds about forty percent of TMDL development costs.

Implementation of a TMDL represents significant costs to pollution sources. For example, fencing may be required to prevent direct deposition into water from cattle, a buffer area may be needed to function as a filter, and failing septic systems may have to be fixed. In addition to these, the implementation involves public participation, and staff travel which add to the overall costs. It is expected that a significant part of implementation costs are labor costs. The agency's total cost estimate for implementing a TMDL in a typical watershed is about \$1.4 million. Thus, the total costs for implementation of TMDLs may increase by about \$142.8 million over the next ten years. There are various cost share and incentive programs for this program, but the exact amount the state may eventually pay is not known.

The proposed changes will also update the ammonia criteria with the newer standards developed by EPA in 1999. Ammonia is a colorless gas with a very sharp odor and may originate from both manmade sources and nature. High levels of ammonia in lakes and streams might cause health effects from skin contact, drinking water, and eating contaminated fish. However, the focus of the current ammonia standard is to protect aquatic life from toxicity.

Current ammonia standards for fresh and salt water vary for the combinations of pH and temperature levels. According to the agency, recent evidence indicates that temperature is not an important factor in determining acute ammonia standards. The proposed acute ammonia standards for fresh and salt water do not depend on temperature. The proposed standards are based on EPA approved criteria. They are generally less stringent than the current standards and are based on most recent scientific evidence. However, the agency does not expect a significant impact on environment or pollution sources.

Currently, only one TMDL has been developed for ammonia standard. Only a small number of nonpoint sources are limiting ammonia discharges. Thus, the impact on nonpoint sources and the amount of discharges are expected to be small. However, the potential development of some TMDLs may not take place in the future for some waters because the proposed change will relax the standard. The agency does not have an estimate on the number of TMDLs that may not be required due to lower standards. Additionally, antibacksliding rule established in other regulations is likely to mitigate the impact of this proposed change on point sources. The point sources are issued permits for ammonia discharges. About 455 permits contain ammonia limits. Due to the antibacksliding rule, the discharge limits for the point sources cannot be reduced in permits. Thus, current permit holders are unlikely to benefit from this proposed change except in the case of an early life stages absent determination discussed in detail below. However, the antibacksliding rules do not apply to new facilities. If new facilities come on line, they are likely to benefit from the proposed change.

In addition, the proposed fresh water chronic standards will allow different ammonia levels in the waters with and without the early stages of fish present. The proposed default standard for ammonia is the standard for the waters with early stages of fish present, but the source will be given an option to demonstrate that the early life stages of fish are absent to comply with appropriate lower standards. Presence of early life stage is seasonal and may be absent during winter months. The proposed language contains a generic process to demonstrate the absence of early life stages of fish. A group of localities in the northern Virginia have already made the determination of the absence of early life stages of fish for November through February in the freshwater tidal Potomac embayments. Since that determination was already performed on a site-specific basis in consultation with the agency rather than according to the

generic process proposed, an amendment to the special standards section has been incorporated as a site-specific standard.

The agency believes that the seasonal variations in the ammonia standards will not be subject to antibacksliding rule and the current permit holders may be allowed to comply with the lower standards during winter months when the waterbody is devoid of early life stages of fish. Since the ammonia standards established in the permits can be relaxed after an early life stages absent determination for a waterbody is completed, some point sources are likely to take advantage of this proposed change.

The treatment technology allows plant operators flexibility in the way they allocate treatment plant capacity between reducing nitrogen discharges and ammonia discharges into water. During the winter months, there is an inverse relationship between ammonia and nitrogen discharged into water. Ammonia contains nitrogen. The first step of the treatment, nitrification process, converts ammonia to nitrate-nitrogen. This process reduces the toxicity contributed by ammonia, but contributes to nitrate-nitrogen discharges. At the second step of the process called denitrification, nitrate-nitrogen from the first step is converted into the harmless gas form of nitrogen and discharged to the air. In other words, ammonia treatment causes an increase in nitrate-nitrogen at the first step, but the total nitrogen discharged into both air and water remains unchanged at the second step. The agency expects that the sources will allocate their limited resources to reduce nitrogen discharges into water when allowed to comply with the early life stage absent ammonia standards. The early life stage absent ammonia standards, where applicable, will allow the sources to remove more nitrogen from waters in the wintertime. This is expected to be an environmentally positive contribution to the Chesapeake Bay.

Additionally, more stringent nitrogen standards are expected to be adopted in 2003 as a separate rule making. Some point sources in northern Virginia are currently upgrading their treatment facilities to reduce total nitrogen discharges to the state waters. Given the substitutability of the ammonia and nitrogen treatment, more stringent standards expected from this separate rule making for nitrogen are likely to strengthen the incentives to demonstrate the absence of early life stages of fish. This approach is especially expected from point sources whose treatment capacity are not sufficient to meet more stringent nitrogen standards expected in 2003. Some of these sources may be able to avoid costs of expanding the treatment capacity to

meet higher nitrogen standards or costs of chemicals used in the treatment process that may be necessary to meet more stringent nitrogen standards. These cost savings are not expected to be large.<sup>3</sup> However, some permitted facilities may choose not to alter the treatment process and reduce the chance of violating permit conditions for ammonia. Prolonged violations of permit limits may result in fines. The agency does not have information to estimate the number of sources who may choose to make a determination to benefit from lower ammonia limits.

## **Businesses and Entities Affected**

The proposed changes will primarily affect 222 point sources required to monitor for bacteria concentrations. In addition, a number of point and nonpoint sources discharging into about 102 waterbodies may be affected in the future. However, it is not known at this time which waters will be classified as impaired. Additionally, the proposal to adopt site-specific ammonia standard will affect Alexandria Sanitation Authority, Arlington County, Fairfax County, and Prince William County Service Authority.

## **Localities Particularly Affected**

The proposed regulations apply throughout the Commonwealth. However, the proposed site-specific ammonia standard is expected to particularly affect Counties of Fairfax, Arlington, Alexandria, and Prince William.

## **Projected Impact on Employment**

Anticipated water quality monitoring requirements, development, and implementation of TMDLs are labor intensive and are likely to increase the demand for labor. Thus, there is likely to be a positive impact on employment in water quality monitoring.

## **Effects on the Use and Value of Private Property**

The value of businesses providing laboratory services for water quality testing and providing other services in prevention of fecal discharges into state waters may increase due to higher volume of business. The value of private property adjacent to state waters where there is a noticeable improvement in water quality may also increase slightly.

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<sup>3</sup> Source: Telephone conversations with Chris Pomeroy, McGuire Woods LLP, and Clyde Wilber, Greeley and Hansen LLC, representing Alexandria Sanitation Authority, Arlington County, Fairfax County, and Prince William County Service Authority.